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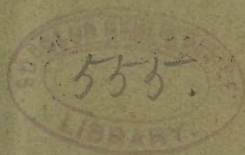
FRANK H. EDSALL, M. D.,

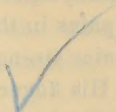
OPHTHALMOLOGIST TO ST. FRANCIS HOSPITAL, PITTSBURG,

—AND—

THEODORE DILLER, M. D.,

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H. T., 52 years of age, blacksmith; denies syphilis. He was in robust health, and working regularly at the time he met the accident about to be described, and to which he attributes all the symptoms from which he now suffers.

Four years ago he fell into a pit eight feet deep, sustaining a fracture of a rib and a number of bruises. He was not rendered unconscious by the fall, but states that he was very much "shaken up" by it, and was in a dazed condition for some time afterwards. The next day after the accident he made an effort to work, but found he was too stiff and sore to do so, and gave up the attempt. He states that he has from that day to this suffered from the symptoms from which he now complains, except that the pain from the broken rib and bruises soon disappeared.

Present Condition.—Short, stout, thick-set man. Walks with feet wide apart, taking short steps, carrying head thrown well

*Read before the Pittsburg Academy of Medicine, October, 1895.

back. The sclera are seen between the upper lids and superior margins of the cornea. His speech is slow, measured, sometimes halting. (This symptom, too, appeared since the accident.) He complains of pains in the occipital region, and along the entire spine. Muscular strength and power of endurance are greatly diminished. His finger movements are clumsy, so that he finds it very difficult to button or unbutton his coat. The knee jerks are normal. No disorder of sensation. There are several points along the spine pressure over which causes much pain.

Examination of the eyes of patient gave the following results: Vision in right eye 20/xxx. In the left eye the vision was reduced to mere light perception. There is complete paralysis of the superior recti muscles of both eyes, although the pupil of the left eye is not quite so much displaced downward from the horizontal plane as is that of the right eye. The internal recti muscles show, also, a partial palsy, the oblique muscles, seemingly, doing most of the work in converging. The oblique muscles and the external recti muscles do not give evidence of being in any way affected. There is a marked staphyloma of the sclera in the superior nasal quadrant of left eye, arising, apparently, from compression due to irregular muscular action upon the globe. The irides show very little response to stimuli of any kind, the pupils being very decidedly contracted and showing little tendency to relax except under a mydriatic.

The fundus of right eye exhibits no marked abnormality. There is a myopia of about 1.00 D., accompanied by a myopic crescent, of moderate size, at temporal margin of disc; and the disc is, also, slightly paler than normal at the temporal border. In the left eye the disc is very oval in form, greenish in color, indistinct in outline, with some of the vessels entirely atrophied and the caliber of the remaining ones very much diminished.

There is also a staphyloma of considerable size at the temporal side of disc.

The most interesting feature of the case is the unusual character of the muscular palsies, the only feasible explanation of which is that given elsewhere in this paper, and which gives rise to some interesting speculations in regard to the location of and connection between certain centers connected with the functions of the eye.

The case is one of unusual interest to both the neurologist and ophthalmologist. The general symptoms presented are those so commonly seen after accidents where the victim has received a general "shaking up," and which have been called "railroad spine," "traumatic neurosis," "traumatic neurasthenia," etc.

From the facts that the eye palsy is bilateral, and affects only certain muscles supplied by the third nerve, it must be concluded that the cause of the palsy is not in the third nerves themselves, but in their nuclei; or else, possibly, as suggested by Gowers,¹ in a higher center. This being admitted, the ocular symptoms offer the strongest sort of evidence in favor of the genuineness of the symptoms which go to make up his traumatic neurosis. Moreover, assuming (what must be the case) that the nuclear disease is more than *functional*—that definite morbid changes have taken place—would it be too much to assume that the manifestations going to make up the symptom—complex, traumatic neurosis, were also dependent upon organic changes in nerve centers?

But it is not our purpose at this time to follow out this interesting train of inquiry, as one of us expects, elsewhere, to dwell upon this phase of the case at some length. It should, however, be added that the case has never been in litigation, nor are such steps contemplated. Now as to the eye symptoms which more immediately concern us in this paper.

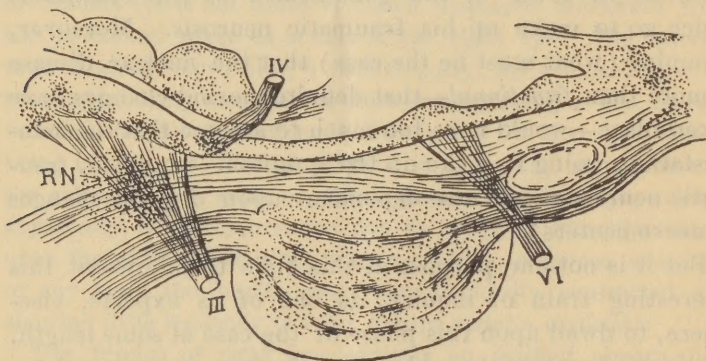
The patient's statement that the eye symptoms, which are now present, arose the day after the accident, and have continued without change up to the present time, must be taken with some caution; yet it must be admitted that some ocular trouble (palsy) dates back to this day after the accident. The symptoms may have been, at times, more pronounced than they are now; but it is quite probable, from the patient's statement, that he carried his head back from the beginning of his trouble; that palsy of the superior recti muscles did begin, as he states, the day after the accident.

¹ Diseases of the Nervous System. Vol. 2, p. 185.

What change occurred in the nucleus which caused these ocular symptoms? One naturally answers, vascular damage or inflammation. Gowers² makes three classes of nuclear palsies according to the probable nature of the morbid process.

1. *Chronic*, due usually to degenerative processes.
2. *Acute*, suggestive of inflammation, (the polio-encephalitis of Wernicke), coming on in a few days or weeks.
3. *Sudden*, occurring within a few minutes, or at most an hour or two, always indicating a vascular lesion.

Gowers lays stress on the distinction between *acute* and *sudden*. Further, he states that "The vascular lesion



Sagittal section through the cerebral axis, to show the nuclei of the ocular nerves in the floor of the aqueduct of Sylvius and the fourth ventricle, and the course of the nerves to their exit, the various groups of cells from which the third nerve may be seen. R. N. red nucleus of the tegmentum; L., lemniscus (sensory tract); CC, motor tract in the crus cerebri seen to traverse the pons and enter the anterior pyramid of the medulla. (Starr.)

which causes sudden palsy, the onset of which is survived, is usually obstruction of the arterial branches which the basilar gives to this part. The obstruction is usually bilateral. Hence small foci of softening are often found in each third nerve nucleus." This explanation perhaps fits our case better than the inflammatory theory, because of the suddenness of the palsy. Besides the symptoms are best explained on the supposition of a bilateral lesion.

²Op. cit. p. 197.

The exact position of the lesions is a matter of interest. The nucleus of the third nerve, as seen in the accompanying diagram, is really a series of nuclei occupying a considerable area in the floor of the aqueduct of Silvius, (10 mm. in length according to de Schweinitz,)³ situated just below and in front of the anterior corpora quadrigemina and extending downwards and backwards, almost to the much smaller nucleus of the fourth nerve. The arrangement of the nuclei according to Hansen and Voelckers,⁴ as modified by Kahler and Pick⁵, is as follows⁶:

“The most anterior portion of the nuclei is related to accommodation, the next to the reflex action of the iris, while the remainder of the nucleus, comprising its chief part, subserves the external muscles in the following order, from before backwards: Internal rectus, superior rectus, levator palpebra superioris, inferior rectus, inferior oblique. But the contiguity is lateral as well as antero-posterior, and the disposition is thus complex.” The annexed scheme is the modification suggested by Kahler and Pick.

Mid-line.

.....
Ciliary muscle.

.....
Sphincter iridis.

.....
Levator palp.

.....
Rect. Int. Rect. Sup.

.....
Rect. Infer. Oblique. Inf.

.....
(Obliq. Sup., 4th n.)

Upon this scheme, our case cannot be satisfactorily explained. Conjugate palsy of the upward movement of the

³ Nervous Diseases by American authors, (Dereum) p. 773.

⁴ Arch. f. Ophthal., Bd. XXIV, 1878 p. 1.

⁵ Prag. Zeitsch. f. Heilk., 1881, p. 301.

⁶ Gower's op. cit.

eyes, in association with paralysis of the levators, has been observed a number of times, and is due, according to Kahler and Pick, to lesions in the posterior part of the third nerve nuclei. In a case reported by Gowers⁷ in which (like our case) the much rarer palsy of the upward movement alone, without involvement of the levators, existed, "A very small tumor was found in the middle line behind the posterior quadrigeminal bodies, damaging slightly these, the velum and the adjacent part of the inferior vermiform process of the cerebellum." This leads Gowers to state that a lesion in the gray matter of the corpora quadrigemina may produce a palsy of the upward conjugate movement of the eyes. But in our case there is palsy of the ciliary muscle, and of the iris; and the anterior portion of the third nerve nucleus presides over these muscles. Moreover, although each internal rectus muscle is active in lateral conjugate movements, the power of convergence is lost. There can be no doubt that there is a separate center for convergence. The power of accommodation, too, is lost; and it is reasonable to assume, as does de Schweinitz, that these two nuclei, normally associated and usually affected together, are situated in close proximity. If this be so, and the main features of the scheme of Pick and Kahler be accepted, then the center of convergence must be situated in the anterior part of the third nerve nucleus. But as the superior recti are paralyzed in our patient, and not the levators, it is reasonable to suppose that the center for the superior rectus is anterior to that of the levator. Because these movements, localized in the anterior portion of the third nerve nucleus, are affected along with, and only with, the superior rectus palsy, we do not believe that the lesion is, as suggested by Gowers, in the corpora quadrigemina, but in the anterior portion of the third nerve nucleus.

To better explain, then, the phenomena exhibited in our case, we would suggest the following modification of the scheme of Kahler and Pick.

⁷ Op. cit. pp. 185-6.

Mid-line.

.....

Ciliary muscle.

Center for convergence.

Sphincter iridis

Rect. Sup.

Lev. palp. Rect. int.

Rect. Infer. Obliq. Inf.

(Obliq. Sup. 4th n.)

The evidence offered by our case permits us to suggest the arrangement in the anterior portion of the nucleus as far back as the center for the superior rectus muscle. It gives no hint as to the exact arrangement of the nuclei behind it.

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